$$W_{opt}(e^{j\omega}) = \frac{S_{dx}(e^{j\omega})}{S_{xx}(e^{j\omega})}$$ Equation 1

$$W_{opt}(e^{j\omega}) = \frac{S_{dd}(e^{j\omega})}{S_{xx}(e^{j\omega})}$$ Equation 2

$$H_e(e^{j\omega}) = \frac{S_r(e^{j\omega})}{S_e(e^{j\omega})}$$ Equation 3

$$H_n(e^{j\omega}) = \frac{S_n(e^{j\omega})}{S_y(e^{j\omega})}$$ Equation 4

$$W(e^{j\omega}) = (1 - H_e(e^{j\omega}))(1 - H_n(e^{jw}))$$ Equation 5

$$H_e(e^{j\omega}) = \frac{S_r(e^{j\omega})}{S_e(e^{j\omega})}$$

$$H_n(e^{j\omega}) = \frac{S_n(e^{j\omega})}{S_y(e^{j\omega})}$$ Equation 6

$$H_e(e^{j\omega}) = \frac{S_r(e^{j\omega})}{\max(S_e(e^{j\omega}), \varepsilon)}$$

$$H_n(e^{j\omega}) = \frac{S_n(e^{j\omega})}{\max(S_y(e^{j\omega}), \varepsilon)}$$ Equation 7

$$H_e(e^{j\omega}) = \min\left(\frac{S_r(e^{j\omega})}{\max(S_e(e^{j\omega}),\varepsilon)}, hmax\right)$$
$$H_n(e^{j\omega}) = \min\left(\frac{S_n(e^{j\omega})}{\max(S_y(e^{j\omega}),\varepsilon)}, hmax\right)$$

Equation 8

$$H_e(e^{j\omega}) = \alpha H_e(e^{j\omega}) + (1-\alpha) H_e(e^{j\omega})\text{prev}$$
$$H_n(e^{j\omega}) = \alpha H_n(e^{j\omega}) + (1-\alpha) H_n(e^{j\omega})\text{prev}$$

Equation 9

$$S_y(k+1,e^{j\omega}) = 0.9 \cdot S_y(k,e^{j\omega}) + 0.1 \cdot \left\{1 - \left[(1-\delta) + \delta \cdot H_e(k,e^{j\omega})\right]^2\right\} \cdot S_e(k,e^{j\omega})$$
$$S_r(k+1,e^{j\omega}) = (1-\beta_e) \cdot S_r(k,e^{j\omega}) + \beta_e \cdot \left[(1-\delta) + \delta \cdot H_e(k,e^{j\omega})\right]^2 \cdot S_e(k,e^{j\omega})$$
$$S_n(k+1,e^{j\omega}) = (1-\beta_r) \cdot S_n(k,e^{j\omega}) + \beta_r \cdot \left[(1-\delta) + \delta \cdot H_r(k,e^{j\omega})\right]^2 \cdot S_y(k,e^{j\omega})$$

Equation 10

$$S_r(e^{j\omega}) = S_e(e^{j\omega})\left|H_e(e^{j\omega})\right|^2$$
$$S_n(e^{j\omega}) = S_y(e^{j\omega})\left|H_n(e^{j\omega})\right|^2$$

Equation 11

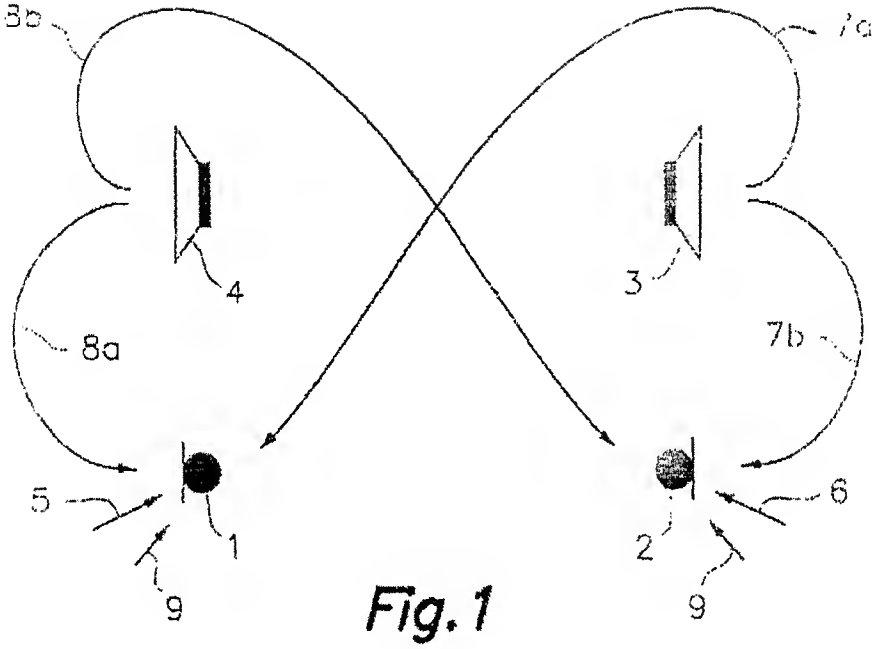


Fig. 1

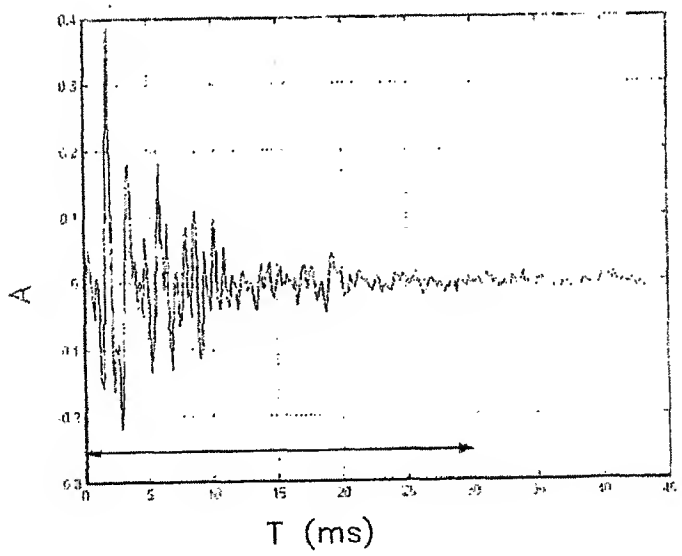


Fig.2

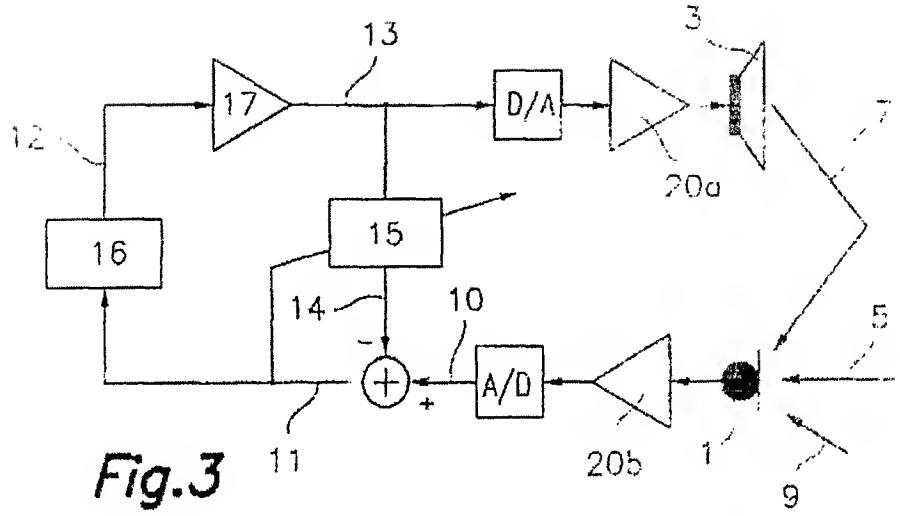


Fig.3

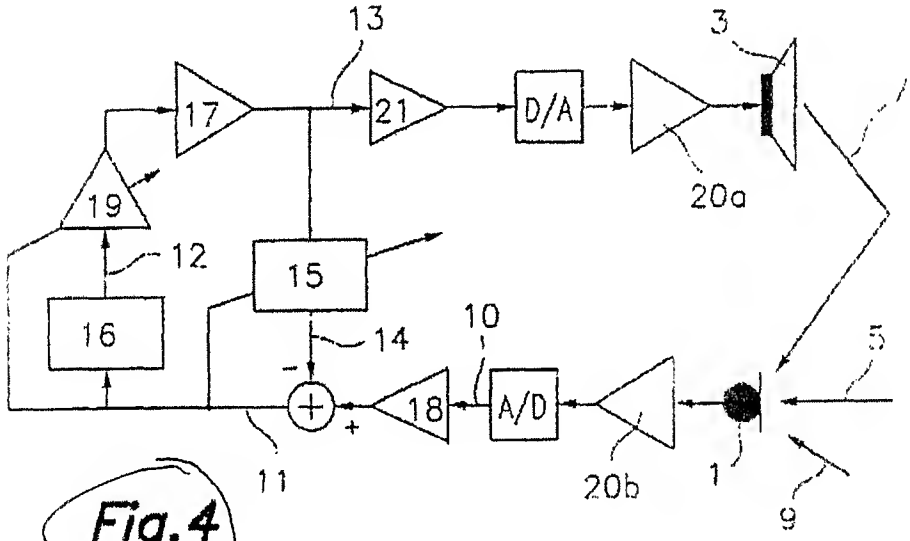


Fig.4

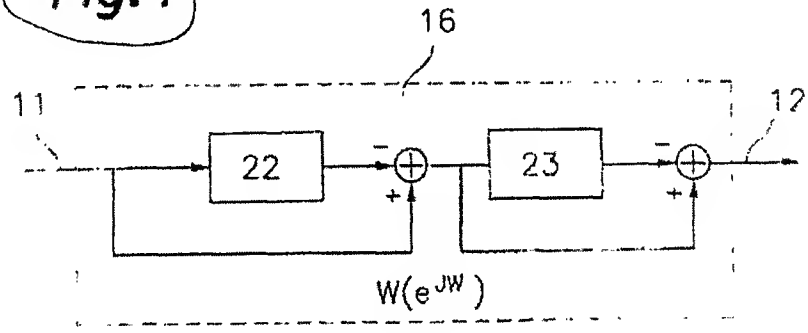
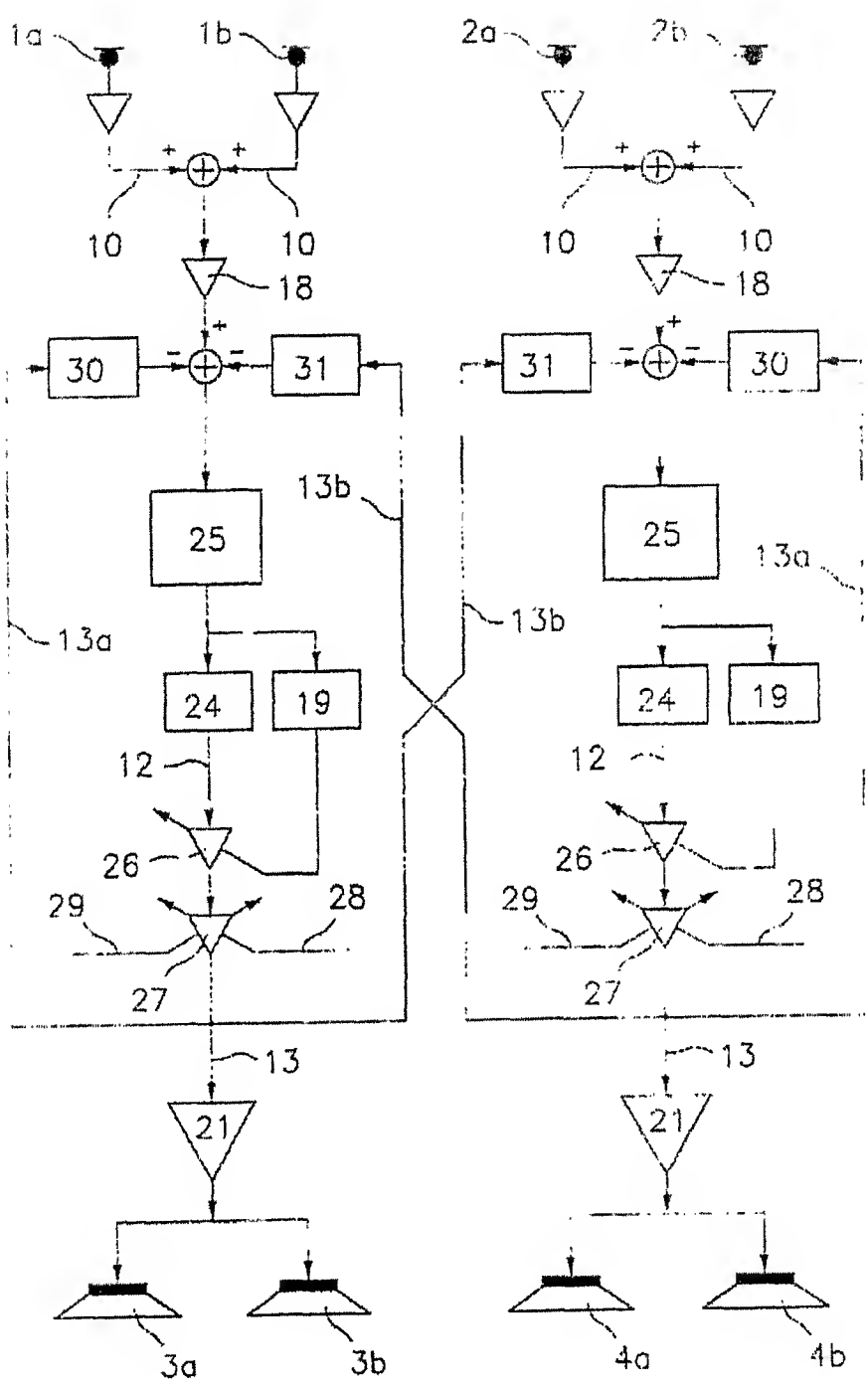


Fig.5


1a
1b
2a
2b
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18
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31
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13b
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13b
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3a
3b
4a
4b

Fig.6

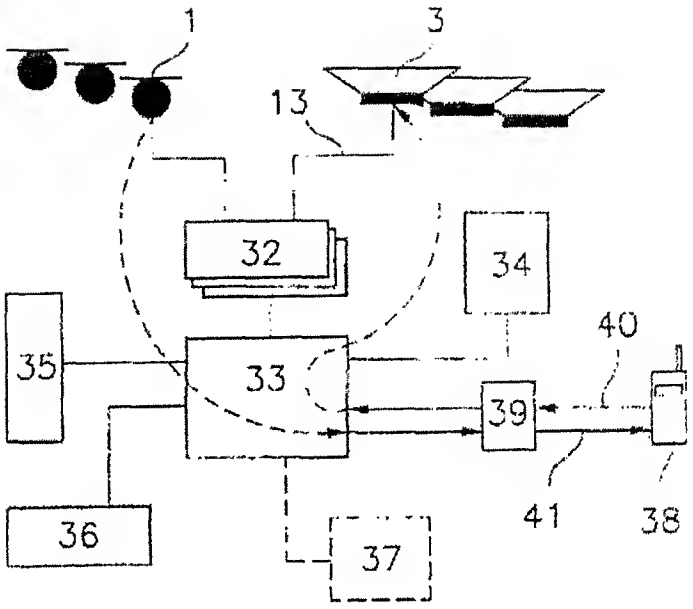

Fig.7

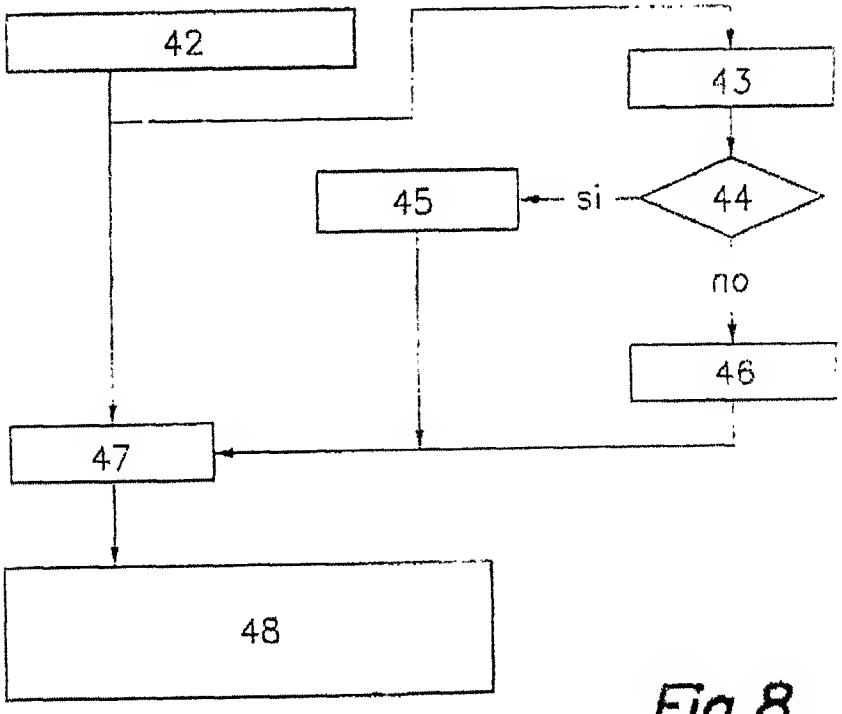

Fig.8

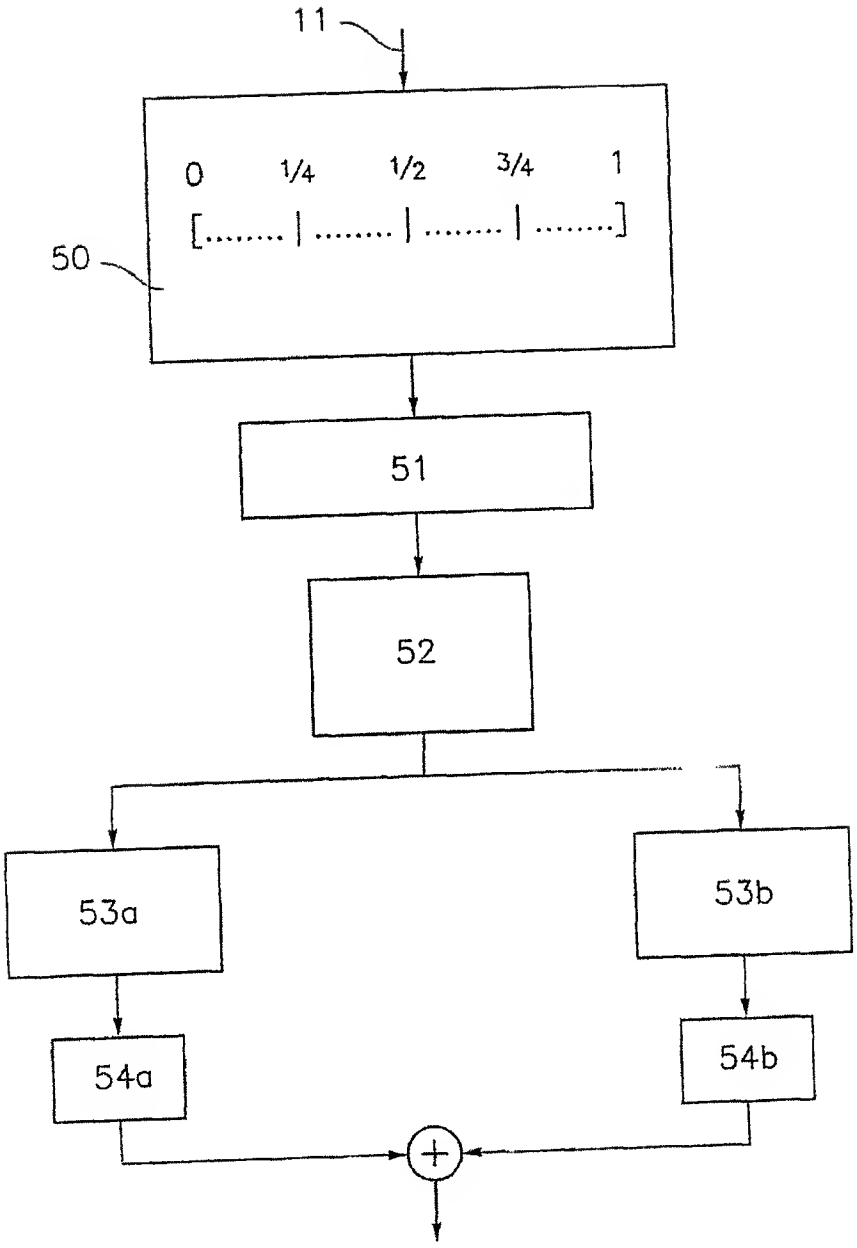

Fig.9